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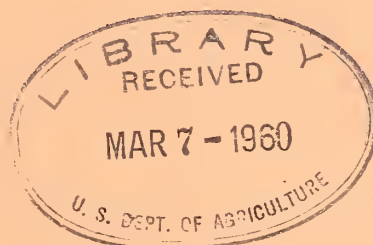
TECHNICAL EQUIPMENT REPORT NO. F-4

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# MODIFICATIONS OF THE U.S.F.S. MODEL 52A FIRE LINE TRENCHER

BY

ROBERT R. LINDAHL AND DAVID B. KIBLER  
FOREST SERVICE, U. S. DEPARTMENT OF AGRICULTURE  
JEFFERSON NATIONAL FOREST, VIRGINIA



FOREST SERVICE  
U. S. DEPARTMENT OF AGRICULTURE  
WASHINGTON, D. C.



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The field forces of the Jefferson have made several changes or modifications to the fire line trencher, U.S.F.S. Model 52A, all intended to improve the ease of operation or to correct weaknesses that developed during use of the machine.

The dog-type clutch has been a major source of trouble. The sudden shock when the clutch was engaged made it impossible to get more than 4 hours of trouble-free operation. To overcome this sudden engagement and to free the motor of a slight drag from the forward and reversing clutch, a centrifugal-type master clutch was installed on the left side of the engine drive shaft (figs. 1, 2, and 3). This was a 3-1/2-inch clutch with double V belt pulley having a horsepower range of 5 to 7-1/2 (Sears #32A318).

Before installing the clutch and necessary pulleys, the engine crankshaft had to be lengthened 1-1/2 inches and the motor moved 1-1/8 inches to the right. Slotted holes provided for the motor mounting served as a means for adjusting the main drive belt. The sprocket and chain were replaced by a 7.8-inch double V pulley (Sears #9A2904) and two belts (Gates #223 Tr. 11/16 x 42-inch). The 7.8-inch pulley is mounted to the left side of the forward and reversing clutch. Approximately 1/16 inch had to be planed from one side of the 7.8-inch pulley to provide clearance between it and the frame.

At the time this report was prepared, the centrifugal clutch had operated 10 hours satisfactorily. It apparently has corrected the faults of the dog-type clutch.

To keep vines and other brush, which can be very troublesome at times, from winding around the hammer shaft at the rear bearing, a split guard (figs. 4 A and 5) was mounted on the rear of the frame just in front of the hammers. This guard was made from a piece of 6-inch steel pipe (well casing); a clearance of 1/16-inch was allowed between it and the drive shaft.

Flaps bolted to the hammer chains (fig. 4 B) provide a sweeping fanning action and in hardwood stands sweep out a much better finished line than the chains alone. These flaps may be made from the sidewalls of a truck tire or a piece of heavy duty flat belting such as that used around quarries on rock conveyors (fig. 6). They should be a half to one link shorter than the chains.

Squarehead lugs were welded in the holes formerly provided for the use of a spanner wrench to adjust the drive belt for the forward and reversing drive (fig. 7 A). The lugs allow the use of an open-end wrench.

Originally the oil level was difficult to check. The operator had to remove the top metal cover and then reach down into the very restricted area between the forward and reversing clutch and the motor. To overcome this difficulty, a length of 1/2-inch pipe was added to the pipe ell that had been used as a filter and oil gage. A dip stick was made by welding a thin piece of 1/4-inch strip to a 1/2-inch pipe cap. The top metal cover was then hinged at the junction with the front cover and a wingnut bolt on each side used to hold it in place (figs. 1 D and 7 B and C).

In actual line construction with the flail in action, the operator carried a large part of the weight of the machine. To carry all or most of this weight, a mechanical aid in the nature of a third wheel was needed. This aid had to be firm enough to carry the load on a predetermined plane, and yet flexible enough to permit the operator, by a slight downward pressure, to lower the depth of cut. To meet this need a long, car type, spring leaf was installed (figs. 8, 9, and 10). Attachment of the spring leaf, or "lazy man," was designed so that its height could be adjusted to the height of the operator. The most effective height was one that required the operator to keep a slight downward pressure on the handles. This tended to steady the operator and resulted in a more consistent finished line.

On each side of the front end is fastened a tie-down strap for use when the machine is hauled in a truck (figs. 11 and 12). Chains bolted to the truck bed are attached to the straps by means of the hole at the bottom of each strap and a pin and key. A piece of 2 by 4, cut to the correct length and hinged to the truck bed, is equipped with a bolted clamp that fits around the crossbar between the handles and serves as a rigid support while the machine is being transported. Any adjustment needed to take up slack in the two front chains may be made with the wheel leveling adjustment ratchets.



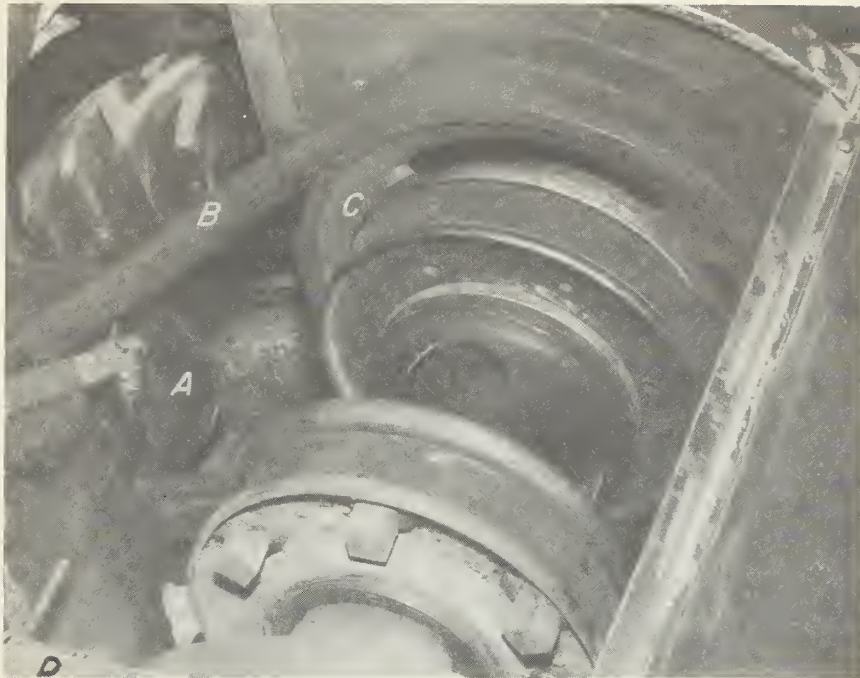


Figure 1.--A, Centrifugal clutch; B, double V belt; C, double V, 7.8 inch pulley; D, wing nut bolt for holding down metal cover.

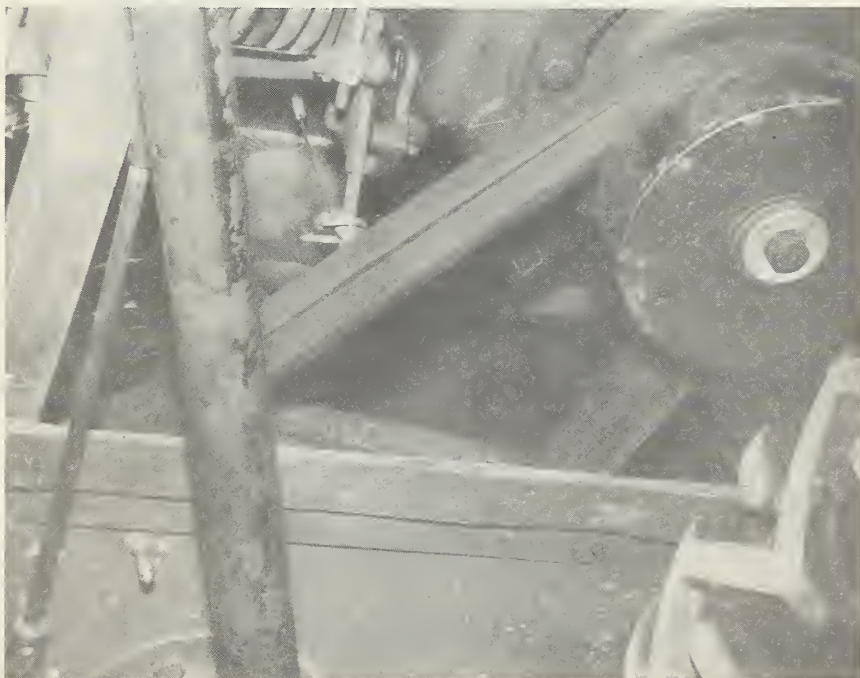


Figure 2.--Side view (left) of clutch mount.

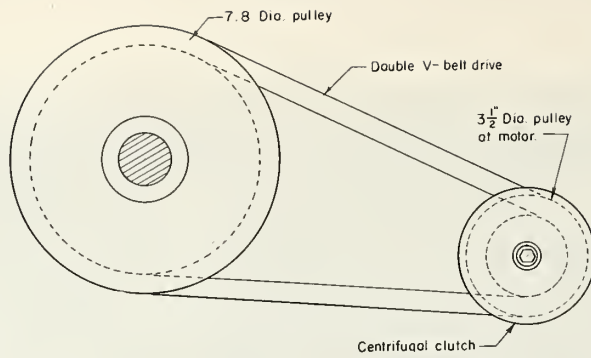


Figure 3.--Centrifugal clutch and V belts which replace chain drive.

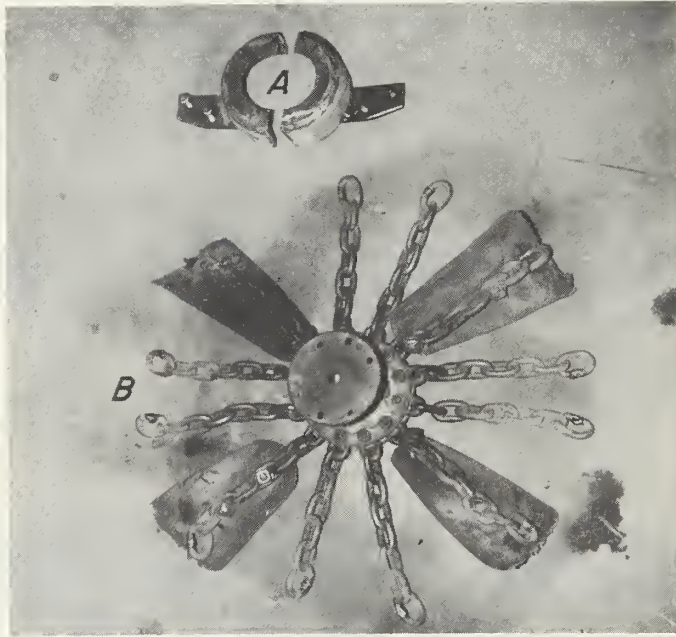


Figure 4.--A, Vine and brush guard for flail drive shaft; B, flailing attachment with flaps in place (flaps have had about 100 hours' use)

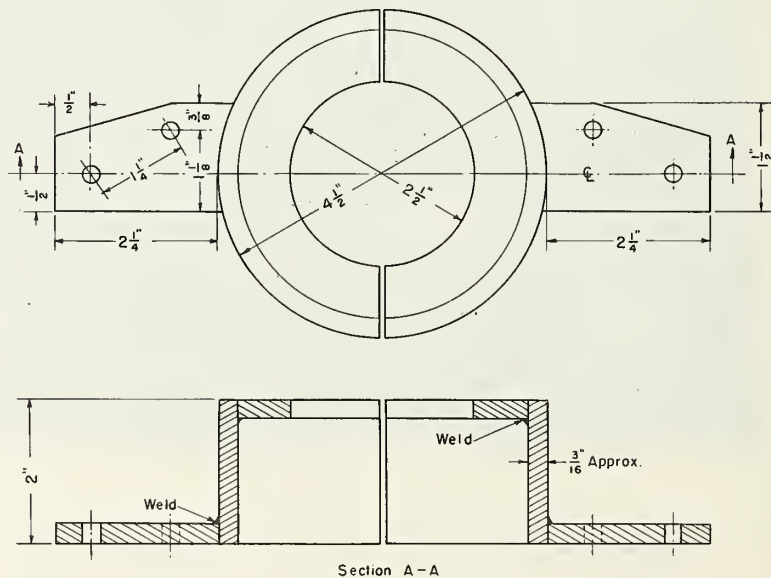


Figure 5.--Split guard for drive shaft.



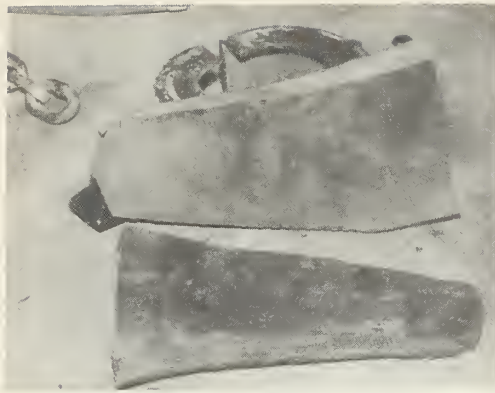


Figure 6.--Flaps cut from truck tire.

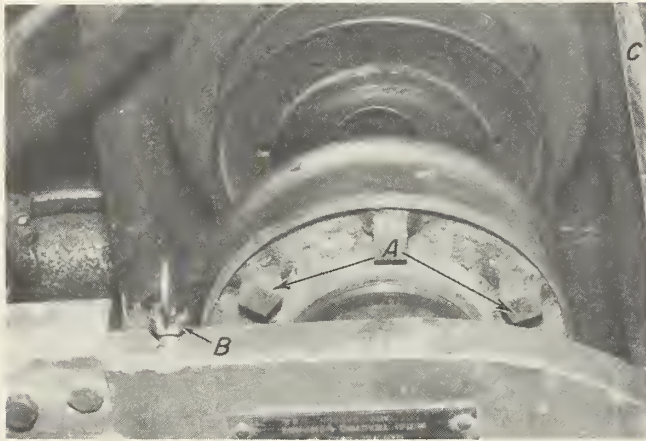


Figure 7.--A, Squarehead 1/2-inch lugs for belt and adjustment; B, wingnut bolt for holding down metal cover; C, point where cover is hinged.



Figure 8.--Third "wheel" skid made from spring leaf allows quick adjustment of depth of cut and carries the load most of the time. The curved end is necessary to prevent digging in when backing up.

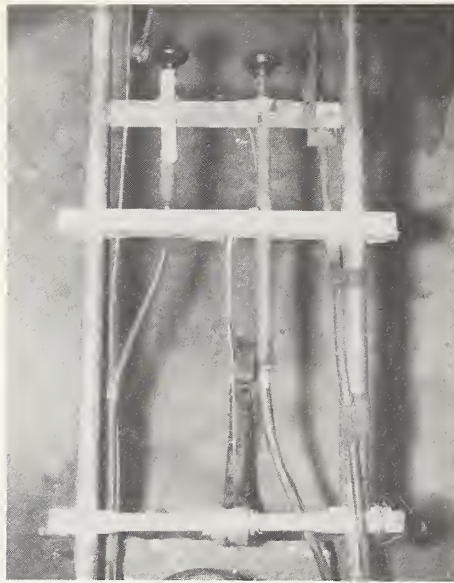


Figure 9.--Third "wheel" skid mounting.

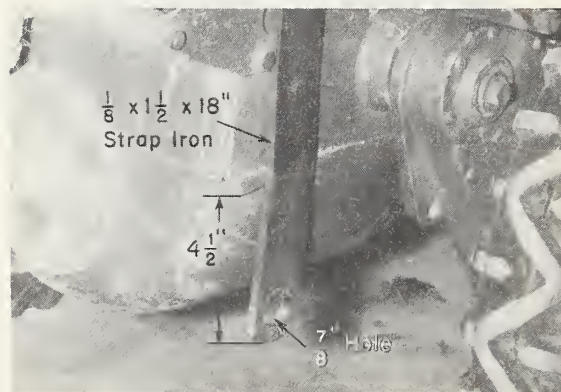
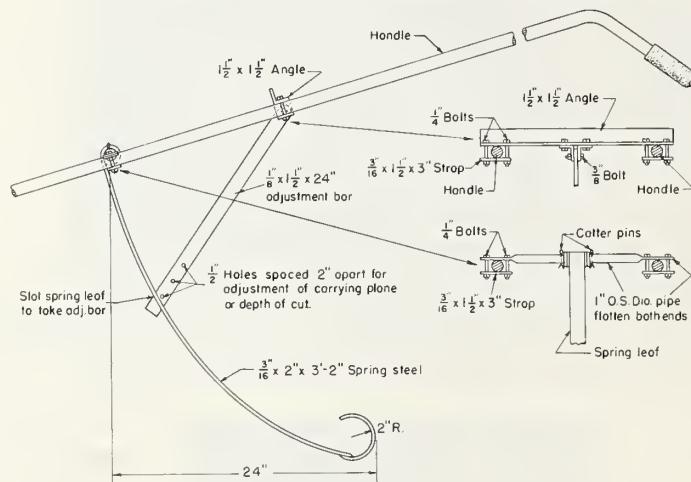


Figure 11.--Front and tie-down strap; one of two for use when hauling the machine in a truck.



